Teachers' Emotional and Behavioral Support and Preschoolers' Self-Regulation: Relations With Social and Emotional Skills During Play

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ABSTRACT

Research Findings: Drawing from a Dutch sample of 113 Dutch children (*M* age = 37 months, *SD* = 3.5) from 37 early care and education classrooms (19 child care centers and 18 preschools), this study examined whether the relation between classroom emotional and behavioral support and children's observed social integration and positive mood in a play situation depends on children's observed behavioral self-regulation. Multilevel analyses revealed a positive association between emotional and behavioral support and children's social integration for children low on behavioral self-regulation, but there was no such association for children high on behavioral self-regulation. Contrary to our expectations, children low on behavioral self-regulation showed more integration in the case of relatively highly supportive classrooms but not less integration in classrooms that were low in support. For children's positive mood, a positive association with emotional and behavioral support was found, and no association was found with behavioral self-regulation. *Practice or Policy*: This study's findings highlight the importance of emotionally and behaviorally supportive classroom experiences for young children's social and emotional skills. Moreover, results hint that experts should perhaps not see children low in behavioral self-regulation as always at risk for poorer social outcomes.

Most young children in Western countries attend some sort of early care and education (ECE) before they enter the formal schooling system (Organisation for Economic Co-operation and Development, [OECD], 2013a). As a result, ECE settings are, after the home environment, the second most important socialization context in which early child development takes place (Lamb & Ahnert, 2006; McCartney, 2006). Learning to engage in positive and competent social exchanges with other persons is one of the most important developmental tasks that children need to achieve during early childhood (e.g., Pianta, 1999; Sroufe, 1996). Within ECE settings, children have the opportunity to structurally engage in social interactions with both nonfamilial adults and peers. This makes ECE settings unique contexts in which to strengthen children's early social and emotional skills: Children can be stimulated to sustain positive peer interactions; to cooperate with other children; to engage in prosocial behaviors, such as sharing and helping; and to refrain from negative, aggressive behaviors (Ladd, 2005).

Several studies have indicated that high-quality ECE specifically, as indicated by emotionally and behaviorally supportive teacher–child interactions (i.e., process quality), can stimulate children's social and emotional skills (e.g., Burchinal et al., 2008; Mashburn et al., 2008;

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National Institute of Child Health and Human Development Early Child Care Research Network [NICHD ECCRN], 2006). However, some studies have found that these effects of high-quality ECE are stronger for children with certain temperamental dispositions (e.g., Broekhuizen, van Aken, Dubas, Mulder, & Leseman, 2015; Phillips, Fox, & Gunnar, 2011; Pluess & Belsky, 2009). The current study aims to further illuminate this relationship by investigating whether the relation between emotionally and behaviorally supportive teacher–child interactions and social and emotional skills, more specifically children's level of social integration and positive mood, depends on a specific indicator of child temperament: behavioral self-regulation. First we review the literature on the relation between ECE quality and social and emotional skills and how this relation might be moderated by children's temperamental characteristics. Then we elaborate on the specific methods and constructs used in the current study.

ECE Quality and Children's Social and Emotional Skills

Although ECE settings are widely acknowledged as valuable contexts for children's social and emotional skills, research findings have been far from consistent. Although high quantities of center-based child care specifically have sometimes been linked to higher levels of behavior problems (e.g., Loeb, Bridges, Bassok, Fuller, & Rumberger, 2007; NICHD ECCRN, 2003), high-quality ECE has been related to better social skills and fewer behavior problems (e.g., Burchinal et al., 2008; Mashburn et al., 2008; NICHD ECCRN, 2006). When focusing on ECE quality, studies have distinguished between more distal structural quality characteristics (e.g., teacher-to-child ratio and teacher education level) and more proximal process quality characteristics of the ECE environment (e.g., teacher–child interactions; Lamb & Ahnert, 2006; Phillips & Lowenstein, 2011). Whereas structural quality characteristics can be seen as prerequisites for high-quality ECE (but not guarantee it), assessments of process quality care aim to tap into the actual care and stimulation experienced by children (Lamb & Ahnert, 2006). Studies have indeed shown that when structural and process quality characteristics are examined simultaneously, process quality characteristics appear to be the strongest predictors of children's development (Mashburn et al., 2008; Phillips & Lowenstein, 2011; Sabol, Soliday Hong, Pianta, & Burchinal, 2013).

Teachers in ECE settings are assumed to play a central role in stimulating the development of children's social and emotional skills through providing ECE high in process quality (Hamre et al., 2013). Specifically, teachers who are sensitive and responsive to children's emotional and social needs and who create a positive classroom climate are hypothesized to contribute to children's sense of security (Downer, Sabol, & Hamre, 2010) and thereby support children in establishing and maintaining positive relationships with teachers and peers and developing behavior regulation (Merritt, Wanless, Rimm-Kaufman, & Peugh, 2012; Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009). This assumption is confirmed in real-world observational studies (e.g., Burchinal, Kainz, & Cai, 2014; Mashburn et al., 2008; NICHD ECCRN, 2006; Sylva, Melhuish, Sammons, Siraj-Blatchford, & Taggart, 2011) and in experimental studies showing that social–emotional curricula and professional development tools focusing on teachers' responsive interactions can enhance children's social skills, behavior regulation, and emotion understanding (Bierman et al., 2014; Landry et al., 2014). However, the associations in these observational and experimental studies tend to be small, and often there are null findings for some of the assessed outcome measures. One potential explanation for these mixed results is that effects of ECE quality depend on individual characteristics, such as children's temperamental dispositions (e.g., Crockenberg, 2003; Phillips et al., 2011).

ECE Quality × Temperament

Temperament is often defined as "constitutionally based individual differences in reactivity and self-regulation, in the domains of affect, activity, and attention" (Rothbart & Bates, 2006, p. 100). Within this definition, *reactivity* refers to "responsiveness to change in the external and internal environment," and *self-regulation* refers to "processes such as effortful control and orienting that modulate reactivity". In this

relatively broad definition, self-regulation involves children's inherent ability to modulate emotions, behavior, as well as attention based on the social expectations of the situation (e.g., Kopp, 1982; Rothbart & Bates, 2006), such as calming down and talking quietly when in the ECE classroom after being allowed to run and scream outside on the playground, or waiting for a turn when participating in collaborative play situations or group conversations. Although self-regulation consists of cognitive (e.g., attentional), emotional (e.g., calming down) and behavioral (e.g., sitting still) components, the emotional and behavioral regulatory aspects of self-regulation have been related to children's social and emotional skills (e.g., Kim, Nordling, Yoon, Boldt, & Kochanska, 2013; Willoughby, Kupersmidt, Voegler-Lee, & Bryant, 2011). With respect to how children respond or adapt to their ECE environments, there is more research on child temperamental reactivity than on emotional and behavioral self-regulation. In terms of child reactivity, some studies found that children with a more reactive or difficult temperament were more *vulnerable* to adverse environmental influences, exhibiting less social competence and more behavior problems than their less reactive or difficult peers (Deynoot-Schaub & Riksen-Walraven, 2006; Phillips et al., 2012; Pluess & Belsky, 2009) or having a less close teacher–child relationship (Curby, Rudasill, Edwards, & Pérez-Edgar, 2011). However, two of these studies found that these more reactive or difficult children were in general more *susceptible* to both negative and positive environmental influences, showing more behavior problems in relatively low-quality care but also better social and emotional skills when exposed to high-quality care (Phillips et al., 2012; Pluess & Belsky, 2009).

In terms of child emotional and behavioral self-regulation, to our knowledge only one study has specifically investigated the moderating effect of an aspect of child self-regulation on the association between ECE process quality and children's social and emotional skills. This study with 2-year-olds found that children with lower affective self-regulation skills, assessed through delay-of-gratification tasks, were not only more vulnerable but in general more susceptible to both low- and high-quality ECE; children showed both less social competence in lower quality child care and more social competence in higher quality child care (Broekhuizen et al., 2015). These findings are consistent with studies on parenting that have shown that children low on emotional and/or behavioral self-regulation were more vulnerable to less adequate parenting behaviors. For example, one study found that 3-year-old children who scored low on observed effortful control and who experienced less parental positive control exhibited more externalizing behaviors than peers who were average or high on observed effortful control (Karreman, van Tuijl, van Aken, & Deković, 2009). In addition, another study showed that children who scored high on an aggregated measure of mother-rated emotional observed behavioral undercontrol exhibited more mother-rated externalizing behaviors at age 4 when they experienced high levels of maternal negativity than their peers low on emotional and behavioral undercontrol (Rubin, Burgess, Dwyer, & Hastings, 2003). Similarly, one study in preschools and kindergartens showed that children low on teacher-rated effortful control demonstrated more negative emotional arousal and less situational social competence than their peers high on effortful control when they experienced high-intensity peer interactions in the classroom (i.e., high levels of displayed energy and activity; Fabes et al., 1999).

Although the empirical evidence so far has been inconsistent, it seems that children low on emotional and behavioral aspects of self-regulation are more vulnerable to lower quality environmental influences and perhaps also more susceptible to higher quality environmental influences. One plausible mechanism underlying this vulnerability or susceptibility is that children with lower self-regulation skills need and seek more external regulation of their emotions and behaviors than peers with average or high self-regulation skills (Crockenberg, 2003; Rothbart & Bates, 2006). The quality of this external regulation is expected to vary in ECE environments depending on the degree of support the ECE environment provides. The current study focuses specifically on observations of children's ability to regulate and control their sometimes emotionally laden impulses and behaviors during a naturalistic play situation.

Children's Social Integration and Positive Mood

Except for the study by Broekhuizen et al. (2015), most previous research on environment-by-self-regulation interactions has focused on children's negative social and emotional behaviors, such as children's (externalizing) problem behaviors (e.g., Karreman et al., 2009; Rubin et al., 2003). In terms of children's social–emotional development, however, the purpose of ECE is not to prevent problem behaviors but to stimulate children's positive social and emotional skills (e.g., Barnett, 2011). Therefore, the current observational study focused on observing children's positive social and emotional skills in ECE settings.

In terms of children's social skills, we observed children's level of social integration, as learning to engage in positive and competent social exchanges with other persons is one of the most important developmental tasks of early childhood (e.g., Pianta, 1999; Sroufe, 1996). How socially integrated children are in a certain situation is assumed to give an indication of children's ability to cooperate with other children; to engage in positive (pro)social behaviors, such as sharing and helping; and to refrain from negative, aggressive behaviors (Ladd, 2005). Moreover, it is known that these kinds of behaviors can be actively stimulated and guided by supportive teachers. In terms of children's emotional skills, we observed children's positive mood as an indicator of children's general emotional well-being. Although children's emotional well-being was mentioned as one of the most important aspects to focus on in ECE (OECD, 2015), very few studies have observed children's emotional well-being in these settings.

The Current Study

The current study investigates whether the association between ECE process quality and children's positive social and emotional skills, as indicated by children's level of social integration and their positive mood, is different for children depending on their behavioral self-regulatory abilities. In addition, this study addresses three methodological issues regarding the assessment of child behavioral self-regulation and social and emotional skills. First, for children's behavioral self-regulation, most studies have relied either on informant ratings or on laboratory-based, standardized tasks, such as delay-of-gratification tasks (for a meta-analysis, see Duckworth & Kern, 2011). Despite the overall view of children's behavior captured in informant ratings, and the relative objectivity of standardized tasks, both methods have limitations. Whereas informant ratings are subject to rater bias, such as socially desirable responses, standardized task scores are often decontextualized and therefore perhaps less representative of children's actual behaviors in real-life situations (Duckworth & Kern, 2011; Rothbart & Bates, 2006). In contrast, the current study used observations of children's behavioral self-regulation abilities within a naturalistic play situation in the ECE classroom. In this way, we could directly capture how children implement these skills in daily life. A similar approach to observing children's general self-regulation skills was used in other studies as well (Whitebread et al., 2009; Zimmerman, 2000). However, these studies treated self-regulation as a broad overarching concept including the strategic use of attention, effort, verbalizations, and metacognitive and meta-emotional knowledge. The behavioral self-regulation scale used in the current study assesses specifically whether a child is able to meet the social expectations in play situations by adequately controlling and regulating his or her behaviors.

The second methodological issue concerns the assessment of children's positive social and emotional skills. Also for these skills it is argued that observations in naturally occurring situations give the most authentic portrayal of children's behaviors (Neisworth & Bagnato, 2004). Therefore, the current study observed children's level of social integration and positive mood during the same naturalistic play situation. The third methodological strength of the current study is that ECE quality, children's behavioral self-regulation, and social integration and positive mood were scored by independent raters. This reduces the possibility that identified associations can be explained by potential shared method variance.

Hypotheses

The studies conducted to date suggest that the relation between ECE process quality and children's level of social integration and positive mood is moderated by child behavioral self-regulation. We hypothesize that children low on behavioral self-regulation will be more strongly influenced by ECE quality compared to children high on behavioral self-regulation, as children low on behavioral self-regulation may rely more heavily on the external regulation of their behaviors (Crockenberg, 2003; Rothbart & Bates, 2006). More specifically, we expect that children low on behavioral self-regulation will be more *vulnerable* to low-quality ECE. That is, they will exhibit lower levels of social integration and positive mood compared to children who score high on behavioral self-regulation. In addition, we also examined whether these children low on behavioral self-regulation are in general more *susceptible* to ECE quality. That is, they will not only exhibit lower levels of social integration and positive mood compared to children who score high on behavioral self-regulation when exposed to low-quality ECE but also exhibit higher levels of social integration and positive mood in the case of high-quality ECE.

Methods

Participants

Teachers and children in the current study participated in an in-depth video observation study that was a satellite study of the pre-COOL study, a large longitudinal cohort study investigating the developmental effects of characteristics of ECE experiences by following children from age 2 onward on a yearly basis (Veen et al., 2012). Of the 289 centers participating in pre-COOL, 87 centers were selected for the in-depth study using a purposive sample procedure to ensure an equal mix of children from child care centers and preschools and from urban and rural regions. From this selection, 44 centers (51%) with 65 classrooms agreed to participate. For the current study, we selected the 37 classrooms with two or more children participating in the first measurement wave of pre-COOL and for whom parents consented to participation in the in-depth study.

In The Netherlands, ECE settings for children up to age 4 (the age at entrance into universal preprimary education) can be roughly divided into two types: child care centers and preschools. Child care centers (0–4 years) focus on children with two working parents and thus provide full-day child care during the work week. Children can enroll in child care centers from 3 months of age onward, which is the end of paid maternity leave. Children attend a child care center on average 2 to 3 days per week, though with a variation from 1 to 5 days per week (Veen, Roeleveld, & Heurter, 2010). This results from the fact that almost two thirds of Dutch woman work part time (OECD, 2013b). In comparison, preschools (2–4 years) provide half-day educationally oriented programs to prepare children for preprimary education. Preschools can be attended from two up to five half-days per week, depending on the socioeconomic background of parents (i.e., more days when parents have a lower socioeconomic status). The minimum preservice professional development level is similar for preschool and child care teachers (postprimary vocational training of 7 or 8 years), although preschool teachers often have additional (postservice) certificates to work with a specific preschool education program. Of the 37 classrooms that participated in the current study, 18 belonged to preschools and 19 to child care centers. Classroom composition was assessed using teacher reports of the percentage of children with a non-Dutch cultural background, ranging from one (10%) to 10 (100%). In 17 classrooms (45.9%) the majority of children were native Dutch, in eight classrooms (21.6%) there was an approximately equal mix of Dutch and non-Dutch children (40%–70% non-Dutch), and in the remaining 12 classrooms (32.4%) the majority of children had a non-Dutch cultural background.

In total, 95 of the pre-COOL children were present during the video observations, which were the original target children due to the additional available assessments. However, because of the multi-level structure of the data, 18 additional children were randomly selected in classrooms with only

one or two study children to increase the number of observed children per classroom, for a median of three. These additional children had to be present in all four recorded situations. The total 113 study children (54 in preschools and 59 in child care centers) were on average 37 months of age (SD = 3.49; range = 28–45 months), 58 (51.3%) were boys, and 67 (59.3%) were monolingual with Dutch as home language. Classroom teachers (N = 37) were all female, and the majority (n = 26, 70.3%) were native Dutch. Of the remaining teachers, five were Turkish- or Moroccan-Dutch, four were Surinamese- or Antillean-Dutch, and two originated from Eastern Europe. With respect to teachers' education level, 62.1% had completed 7 or 8 years of postprimary vocational training (the minimum level of training), and the remaining teachers had a bachelor's degree. Most teachers had worked in the ECE field for more than 5 years (79.3%).

Procedures

The in-depth study was conducted between the first and second measurement waves of the pre-COOL study. To assess ECE quality, research assistants visited classrooms twice during the same weekday morning (a maximum of 2 weeks apart) to record in total four situations. These four situations of 15–20 min each were two daily recurring situations (free-play time and a snack or lunch moment; both situations occurred in the classroom) and two guided-play situations (one with kitchen materials and one with a train set). To reduce children's reactivity to the filming to a minimum, the research assistant positioned the camera on a tripod in the classroom before the actual filming started. In addition, the research assistant was already in the classroom observing the group for at least 20 min, so the children were already familiar with the assistant moving around in the classroom. The only role of the research assistant was to record the videos.

In one morning, one daily situation and one guided-play situation were recorded. During free-play time (one of the daily situations), children could play throughout the whole classroom with their own toys and materials. For the two guided-play situations, the main teacher was asked to aim for minimally five children between 2 and 4 years to start the activity with, including all of the pre-COOL children present that day. Standard play materials were used for the guided-play situations to guarantee comparability between classrooms. Teachers received no specific instruction for these two situations; they could do what they would normally do with these children and those materials. After 15 min of recording, the teacher was told that she could finish the play, and the research assistant stopped recording after the activity was completely ended, for a maximum of 20 min.

To assess the general ECE quality that children experienced, we averaged classroom quality scores (assessed with the Toddler version of the Classroom Assessment Scoring System [CLASS]; see "ECE Quality—Emotional and Behavioral Support") over the four recorded situations. We choose to use all four situations because it gave a more reliable picture of teachers' behaviors. Moreover, children's behaviors are influenced not only by the quality of the teacher–child interactions they experience in a specific moment but also by the quality of teacher–child interactions they expect based on their earlier experiences in the classroom. For children's behavioral self-regulation, social integration, and positive mood we focused on the play situation with the kitchen materials (i.e., a box with plastic pots, pans, cutlery, plates, and different kind of toy foods). This situation aimed to elicit less prestructured, more open play, which made it a suitable situation for observing children's behavioral self-regulation specifically and how children navigate social (play) situations. This assumption is confirmed by the finding that the observed behavioral self-regulation score in the situation with the kitchen materials was significantly correlated with a combined measure of two delay-of-gratification tasks assessed at the first measurement wave in the pre-COOL study ($r = .22$, $p = .03$), although this was not the case for the behavioral self-regulation score in the situation with the train set ($r = -.07$, $p = .53$). More information on this can be found in "Child Behavioral Self-Regulation." Both the free-play time and the snack/lunch moment were not suitable for observing children's self-regulation. During the snack/lunch moment, fewer relevant child behaviors could be observed (e.g., children

were sitting at one or two high tables, which allowed for little freedom of movement). During free-play time, children and teacher(s) were followed in cycles of 1.5 min with only two cycles per child, which was not sufficient time to observe instances in which behavioral self-regulation could be evaluated.

All research assistants involved in the coding of the recorded situations were bachelor's and master's-level university students/graduates in social sciences. Research assistants who scored ECE quality were not included in scoring the child characteristics. In addition, the child observational measures were divided into two separate packages: Assistants who scored child behavioral self-regulation (the moderator variable) did not score children's level of social integration and positive mood (dependent variables). This procedure reduced potential shared method variance. Finally, research assistants were blind to the objectives of the study.

ECE Quality—Emotional and Behavioral Support

To assess ECE quality, research assistants scored all four recorded situations with the Toddler version of the CLASS. The CLASS Toddler comprises eight dimensions fitting two higher order domains: (a) Emotional and Behavioral Support and (b) Engaged Support for Learning (La Paro, Hamre, & Pianta, 2011; La Paro, Williamson, & Hatfield, 2014). Five research assistants were trained in the CLASS Toddler by a certified trainer. After receiving oral and written instructions, assistants completed an online reliability test by scoring five standard video fragments using an approved Dutch translation of the standardized CLASS manual (Slot, Leseman, Mulder, & Verhagen, 2013). Assistants passed the reliability test when dimension scores reached within 1 point agreement of 80% with the trainer (average agreement was 86.4%; agreement by chance is 33%). After the coding was completed, a random sample of 10 videos was coded by a researcher not involved in the current study to control for observer drift. The average agreement within 1 scale point ranged from 81% to 100% for the five research assistants.

In the current study, only the Emotional and Behavioral Support domain was used, given our interest in children's social and emotional skills. This domain consists of five dimensions: *Positive Climate*, reflecting the warmth, respect, and enjoyment displayed during interactions between the teacher and children; *Negative Climate*, reflecting the overall negativity expressed in the classroom by the teacher and the children (reverse scores); *Teacher Sensitivity*, evaluating the extent to which the teacher is aware of and responsive to children's needs; *Regard for Child Perspectives*, capturing the degree to which the teacher's interactions with children and the classroom activities provided are attuned to children's interests and the degree to which children's independence is encouraged; and *Behavior Guidance*, referring to the teacher's ability to promote positive behavior and redirect problem behavior. Research assistants rated all dimensions on a 7-point rating scale, with 1 and 2 reflecting a low score and 6 and 7 reflecting a high score. Dimension scores were first averaged by classroom over the four situations. Then the five dimension scores were averaged, which resulted in a mean score on Emotional and Behavioral Support of 4.99 (*SD* = 0.44, range = 4.20–6.09, α = .79). This mean level is comparable to studies based in the United States using the CLASS Toddler (La Paro et al., 2014) or CLASS Pre-K (e.g., Burchinal, Vandergrift, Pianta, & Mashburn, 2010; Hamre, Hatfield, Pianta, & Jamil, 2014)

Child Behavioral Self-Regulation

To assess children's behavioral self-regulation, we used the subscale Behavioral Self-Control of the Self-Regulation in Play Scale, a newly developed Dutch observational measure that assesses cognitive, emotional, and behavioral aspects of children's self-regulation skills. To the best of our knowledge, no observational measures were available at the time of the study to assess children's behavioral self-regulation skills in a naturalistic setting. More detailed information on the development of the Self-Regulation in Play Scale, which was developed by the second author, is available elsewhere (Slot,

Mulder, Verhagen, & Leseman, 2015). The subscale used in this study assesses the degree to which a child is able to meet the social demands of a situation and control or adapt his or her behavior accordingly (Kopp, 1982). In the context of play, an example is whether the child is able to wait for a turn during a group conversation or in playing with peers. In addition, we observed which strategies children used in getting a desired object from a peer (e.g., asking for it or grabbing it away) and whether children were able to meet behavioral expectations stated by the teacher (e.g., staying at the table when the teacher requested this). Research assistants rated children's level of behavioral self-regulation on a 5-point rating scale ranging from low (1) to high (5) after watching the full 15–20 min video fragment. A high score reflects a child who shows behavioral self-regulation frequently or consistently throughout the video fragment (e.g., being able to wait for a turn or staying at the table when this was the classroom expectation at that time). A mid-range score (3) reflects a child who could sometimes (at least three or four times) show the desired behavior or show it only when it was explicitly supported by the teacher (e.g., the teacher intervened in a peer conflict and requested that the child share toys and the child complied). A low score was assigned when the child was not able to meet the classroom expectations or showed this behavior rarely, only once or twice, while at the same time showing behavior not matching the classroom expectations at that time. A score of 2 or 4 was assigned when the behavior of children fell in between either the low and mid-range or mid-range and high categories.

Seven research assistants were trained in the larger set of scales. Following the two-half-day training, the research assistants had to take a reliability test by coding two videos independently. Six assistants passed the predetermined reliability criterion of 80% agreement within 1 scale point difference with the second author for all scales and coded the remaining videos. In addition, part of the data (at least 18%) was coded independently by both the second author and each assistant to determine interobserver reliability. The intraclass correlation coefficient (ICC) for absolute agreement for the subscale assessing behavioral self-regulation was .57, and the average interobserver agreement within 1 scale point difference was 84%. As already mentioned in "Procedures," we correlated the scores on the newly developed subscale assessing behavioral self-regulation with a combined measure of two delay-of-gratification tasks assessed at the first measurement wave in the pre-COOL study. These two tasks from the widely used effortful control battery of Kochanska and colleagues (2000) were adapted for field-based research with 2-year-olds (Mulder, Hoofs, Verhagen, Van Der Veen, & Leseman, 2014; Mulder, Verhagen, & Leseman, 2012) and assess children's ability to inhibit a dominant response to an affectively salient reward. The modest correlation of .22 ($p = .03$) between these two related, although different, constructs is consistent with other studies examining relations among different types of measures of children's self-regulation (e.g., Duckworth & Kern, 2011) and supports the validity of the newly developed observational measure of children's behavioral self-regulation.

Children's Social Integration and Positive Mood

To assess children's social integration and positive mood during the play situation with kitchen materials, we used two global rating scales of the modified version of the Observational Rating of the Caregiver Environment (M-ORCE; Gunnar & Ahern, 2001), namely, Belongingness/Integration and Positive Mood. The Overall Sense of Belongingness/Integration (here referred to as *social integration*) scale was created for the M-ORCE, and the Positive Mood scale was adapted and adjusted from the original ORCE. See Kryzer, Kovan, Phillips, Domagall, and Gunnar (2007) for a description of the differences between the ORCE and the M-ORCE. Several studies have successfully implemented the M-ORCE (e.g., Almas et al., 2011; Kryzer et al., 2007; Phillips et al., 2012). The video fragment was watched for the full 15 to 20 min for each child. At the end of each fragment, research assistants rated children on both their level of positive mood and social integration on a 4-point scale.

The aim of the *social integration* scale is to get a sense of the degree to which a child feels accepted and comfortable in the ECE setting with both other children and adults. From the perspective of the

child, does he or she fit in, or does he or she seem to be more of an outsider looking in (i.e., a fringe person)? To what extent is the child integrated into the activities of other children? When the child plays on his or her own, does this seem like a personal choice? A score of 1 reflects that a child appears not to be integrated at all, a score of 2 reflects that a child appears to be feeling nominally integrated, a score of 3 reflects that a child appears to be feeling moderately integrated, and a score of 4 reflects that a child appears to be feeling fully integrated.

The aim of the *positive mood* scale is to assess both the quantity and quality of children's (lack of) positive mood. Indicators of children's positive mood include behaviors like smiling, laughing, a positive tone of voice, and (intense) expressions of interest. However, indicators of a lack of positive mood are low energy, neutrality, and a negative mood. A score of 1 reflects no signs of positive mood, a score of 2 infrequent or weak signs of positive mood, a score of 3 frequent signs of positive mood, and a score of 4 that a child is both physically and vocally exceptionally positive.

Three research assistants were trained in the two M-ORCE scales during a two-half-day training using the original English version of the manual (Gunnar & Ahern, 2001). We used the English version, because no Dutch translation of the M-ORCE is available, and our research assistants were all fluent in English. Following the first half-day, research assistants had to score independently 12 children who were not part of the current study. During the second half-day, discrepancies between the scores of the assistants and the trainer (the first author) were discussed as part of the training phase. After the training was completed, research assistants were allowed to independently code the video fragments. To determine interobserver reliability and monitor possible observer drift during the coding process, two of the four persons (i.e., three research assistants plus trainer) involved in the coding double-coded 30% of the data. The average single-measures ICCs for absolute agreement for the scales were .83 for social integration and .69 for positive mood .

Covariates

To control for possible preexisting differences among children and possible confounding factors, we selected the following child characteristics as covariates: children's age, their gender, and whether they were learning Dutch as a second language. It may be more difficult for young children who are learning Dutch as a second language to communicate verbally with both adults and peers, which may influence both their level of social integration and positive mood. We also controlled for several classroom characteristics that could have acted as confounding factors for the identified associations. These characteristics were classroom cultural diversity (from 1 = 10% to 10 = 100%), the number of children during the play situation with the kitchen materials, and the type of ECE (preschool or child care center).

Analysis Strategy

Multilevel analysis (Hox, 2010; Snijders & Bosker, 2012) was used to investigate whether the average measure of classroom emotional and behavioral support interacted with children's observed behavioral self-regulation in predicting children's level of observed social integration and positive mood during the play situation. Officially, our data had a three-level structure: the child (Level 1), classroom (Level 2), and center (Level 3) levels. However, because more than half of the centers (*n* = 19) provided only one classroom, and the other nine centers provided only two classrooms, we analyzed the data within a two-level model (i.e., child and classroom levels). We used Mplus 7.11 (Muthén & Muthén, 2013) to estimate a series of multilevel models for children's level of social integration and positive mood simultaneously. In the first model, the null model, we estimated the amount of variance in the outcomes at the child level (Level 1) and classroom level (Level 2) and calculated the ICC (σ Level 2/[σ Level 1 + σ Level 2]). In the second model, the full model (i.e., main effects model), we included children's behavioral self-regulation (Level 1) and classroom emotional and behavioral support (Level 2) as predictors, together with the child- and classroom-level covariates. In the third model, the random slopes model, we investigated whether the

relation between behavioral self-regulation and both social integration and positive mood (Level 1) was different for children depending on the classroom they were in (Level 2). Next, in the slopes as outcomes model (i.e., the interaction model), we included classroom emotional and behavioral support as a predictor of the random slope parameters of behavioral self-regulation in relation to both social integration and positive mood (i.e., the cross-level interactions). Finally, to decide which model provided the best fit to the data, we compared this slopes as outcomes model with the random slopes model (i.e., without classroom emotional and behavioral support as a predictor of the random slope parameters) and the full model (i.e., the main effects model) using Akaike's information criterion (AIC; Akaike, 1973). Model equations for these different multilevel regression models can be found in Hox (2010).

Missing data for the study variables ranged from 0% to 8% and were missing completely at random (Little's missing completely at random test, $\chi^2 = 14.54$, $p = .267$). To address missing data, we used full information maximum likelihood estimation as an approach for model estimation (Enders, 2010). In addition, nonnormality in the outcome variables was addressed by using a robust maximum likelihood estimator, which uses a sandwich estimator to compute robust standard errors. Furthermore, predictors were centered at the grand mean in the slopes as outcomes model to avoid multicollinearity problems (Cohen, Cohen, West, & Aiken, 2003). Finally, all covariances between the classroom-level variables (emotional and behavioral support, classroom cultural diversity, number of children during the play situation, and type of ECE) were specified in the full model (i.e., the main effects model) to ensure that associations between certain classroom-level variables and children's social integration and positive mood were not confounded by other classroom characteristics. We subsequently trimmed these covariances in a step-by-step fashion by eliminating nonsignificant paths with $p > .10$. The remaining significant paths were also included in the slopes as outcomes model (i.e., the interaction model).

Results

Descriptive statistics and correlations between the study's predictor and outcome variables are presented in Table 1. Children's positive mood and social integration, which were assessed by the same research assistant, were positively correlated with each other. Both children's behavioral self-regulation and classroom emotional and behavioral support were, however, not associated with either positive mood or social integration. There was a negative association between the number of children present during the play situation with kitchen materials and children's level of social integration. In addition, being in preschool instead of child care was associated with somewhat higher levels of positive mood.

There were some significant correlations among the classroom characteristics, most of which reflected differences in the background characteristics of children attending either preschools or child care centers. There were fewer children with an ethnic minority background in child care, and therefore child care classrooms were less ethnically diverse. In addition, children in preschool were somewhat older at the start of the study, as preschools can only enroll from age 2 or age 2.5 onward, depending on the preschools themselves. Finally, the level of emotional and behavioral support was somewhat lower in more ethnically diverse classrooms.

Null Model and Full Model

First we specified a null model to estimate the amount of variance at both the child and classroom levels. For both social integration and positive mood, some variance could be attributed to the classroom level (i.e., Level 2); the ICC was .09 for social integration and .10 for positive mood. In other words, children in the same classroom were more similar to one another than children in other classrooms on both social integration and positive mood, which might be explained by classroom (i.e., Level 2) characteristics.

Next the null model was expanded with child behavioral self-regulation (i.e., Level 1), classroom emotional and behavioral support (i.e., Level 2), and the covariates as predictors. The

Table 1. Descriptive Statistics and Correlations for Main Predictor and Outcome Variables.

Variable	M	SD	Range	1	2	3	4	5	6	7	8	9	10
Child level (Level 1)													
1. Age (months)	37.45	3.49	28.00–45.00	—									
2. Gender (1 = girl; %)	47.8			.11	—								
3. Non-Dutch (%)	39.6			.05	.00	—							
4. Behavioral self-regulation	3.54	1.04	1.00–5.00	−.16	−.13	.06	—						
5. Social integration	2.56	0.66	1.50–4.00	.21*	.10	.08	−.09	—					
6. Positive mood	2.42	0.59	1.50–4.00	.11	.09	.10	.06	.65**	—				
Classroom level (Level 2)													
7. Emotional and behavioral support	4.97	0.43	4.20–6.15	−.08	.12	−.13	.01	.06	.16	—			
8. Classroom diversity	4.80	3.68	1.00–10.00	.24*	−.03	.57*	−.05	.04	.07	−.20*	—		
9. Number of children[a]	5.66	1.42	3.00–10.00	−.10	−.14	−.22*	−.05	−.24*	−.17	.02	−.22*	—	
10. Type (1 = child care; %)	52.2			−.31*	−.03	−.33*	−.12	−.09	−.22*	.04	−.47*	−.24*	—

[a]Number of children present during the play situation with the kitchen materials.
*$p < .05$. **$p < .01$.

regression coefficients and ICCs for the full model are given in Table 2. For social integration, only the number of children during the play situation with kitchen materials was a significant predictor, with more children present being associated with lower levels of social integration. There was no main effect of classroom emotional and behavioral support or child behavioral self-regulation. For positive mood, higher levels of classroom emotional and behavioral support were associated with higher levels of positive mood. There were no significant associations with the other predictors.

A comparison of the ICCs of the null model and the full model indicated that most classroom-level variance (i.e., Level 2 variance) in social integration and positive mood was already explained in the full model. However, to investigate a cross-level interaction between emotional and behavioral support and child behavioral self-regulation, the criterion that there needs to be variance at the second level is far less important, especially with a relatively small average cluster size (e.g., Nezlek, 2012). That is, when emotional and behavioral support only has an effect on children scoring low on behavioral self-regulation (which could only be one or two children per classroom), then children in the same classroom are not necessarily more similar to one another than they are to children in other classrooms. Therefore, we continued with the subsequent steps of the multilevel analysis for both outcome variables.

Table 2. Full Model Predicting Social Integration and Positive Mood.

	Social Integration		Positive Mood	
Variable	B	SE	B	SE
Level 1—Child				
Intercept	2.52	1.00	2.74	0.68
Age	0.02	0.02	0.00	0.02
Gender	0.03	0.13	0.06	0.12
Non-Dutch	0.07	0.20	0.05	0.18
Behavioral self-regulation	−0.06	0.07	0.03	0.05
Level 2—Classroom				
Emotional and behavioral support	0.10	0.19	0.21*	0.08
Classroom diversity	−0.01	0.03	−0.05	0.02
Number of children	−0.11*	0.04	−0.05	0.03
Type (1 = child care)	−0.03	0.15	−0.22	0.13
ICC	.03		.01	
AIC	1510.3			

Note. ICC = intraclass correlation coefficient; AIC = Akaike's information criterion.
*$p < .05$.

Random Slopes and Slopes as Outcomes Model

To investigate whether children's behavioral self-regulation interacted with classroom emotional and behavioral support in predicting children's social integration and positive mood, we first expanded the model with a random slope for behavioral self-regulation. The results of this model showed that there was some variance around the slope for behavioral self-regulation in relation to social integration ($\sigma = .035$, $p = .136$) and no variance around the slope for behavioral self-regulation in relation to positive mood ($\sigma = .001$, $p = .916$). The absence of significant variance around these slopes means that the relation between children's behavioral self-regulation and social integration and positive mood did not differ between classrooms. However, this could again be due to the fact that our cluster sizes were relatively small (median = 3) and that we had a relatively small sample size at the cluster (i.e., classroom) level ($N = 37$). These circumstances make it hard to find *within-cluster* (i.e., classroom) differences in the slopes. Furthermore, it has been suggested that if you expect a cross-level interaction on theoretical grounds, you might still want to test it, because the test for cross-level interactions has more statistical power than the test for the random slopes (Snijders & Bosker, 2012).

Based on this reasoning, the model was expanded with a cross-level interaction for both social integration and positive mood. In the resulting slopes as outcomes model (see Table 3), one of the two cross-level interactions appeared to be significant: The level of classroom emotional and behavioral support (Level 2) influenced the association between behavioral self-regulation and social integration (Level 1; $B = -0.41$, $p = .025$). Including emotional and behavioral support as a predictor decreased the variance around the slope from .035 to .006, which is a decrease of 83%. In addition, the ICC for social integration decreased from .03 in the full model to .01 in the slopes as outcomes model. Finally, including the cross-level interactions decreased the AIC from 1509.1 for the random slopes model to 1507.0 for the slopes as outcomes model. This AIC was also lower than the AIC of the full model without random slopes and cross-level interactions, which was 1510.3. Because the slopes as outcomes model was most informative, we decided that this was the final model.

Interpretation of Cross-Level Interaction

In order to interpret the significant cross-level interaction between child behavioral self-regulation and classroom emotional and behavioral support, we calculated simple slopes at minus and plus 1 *SD* from the sample mean of child behavioral self-regulation (±1.04; Cohen et al., 2003). The significance of these slopes was calculated using the regression coefficient variances and covariances (Preacher, Curran, & Bauer, 2006). Figure 1 displays a significant positive association between classroom emotional and behavioral support and children's social integration for children scoring relatively low on behavioral self-regulation ($B = 0.43$, $p = .005$). For children relatively high on behavioral self-regulation there visually seems to be a negative association between classroom emotional and behavioral support and child social integration, but this slope was not significant ($B = -0.43$, $p = .168$).

Table 3. Final Slopes as Outcomes Model Predicting Social Integration and Positive Mood.

Variable	Social Integration		Positive Mood	
	B	SE	B	SE
Level 1—Child				
Behavioral self-regulation	−0.02	0.06	0.04	0.05
Level 2—Classroom				
Emotional and behavioral support	0.00	0.15	0.18*	0.08
Slope behavioral self-regulation | emotional and behavioral support	−0.41*	0.18	−0.13	0.10
ICC	.01		.01	
AIC	1507.0			

Note. The same covariates were included (see Table 2), and the regression coefficients were practically the same. ICC = intraclass correlation coefficient; AIC = Akaike's information criterion.
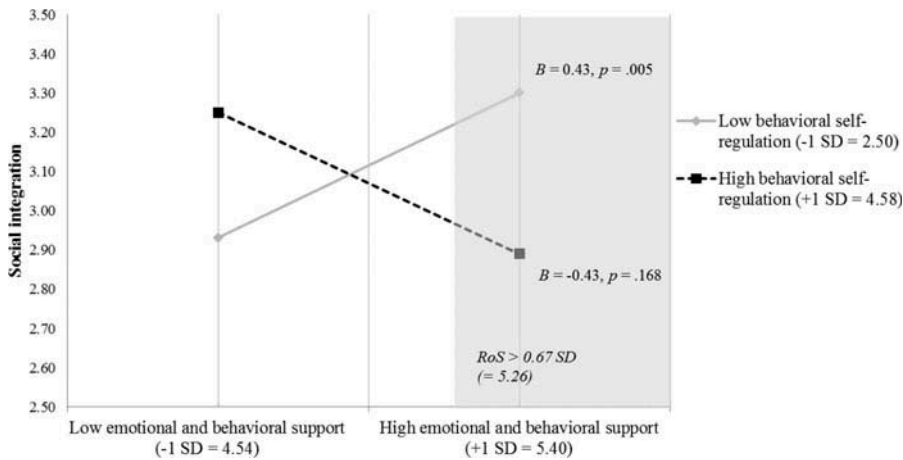
*$p < .05$.

Figure 1. Cross-level interaction between child behavioral self-regulation and classroom emotional and behavioral support in relation to child social integration, including regions of significance (RoS; shaded areas). In this study, emotional and behavioral support scores ranged from 4.20 to 6.15, and behavioral self-regulation scores ranged from 1.00 to 5.00.

In addition to the examination of simple slopes, a region of significance analysis was conducted (Preacher et al., 2006; Roisman et al., 2012) to calculate at which values of emotional and behavioral support the difference in social integration between children low and high on behavioral self-regulation was significant. This analysis indicated that low behavioral self-regulation negatively predicted social integration at levels of classroom emotional and behavioral support <-2.44 SD below the sample mean (<3.92; outside the plotted area and possible range of scores in our sample) and positively predicted social integration at levels of classroom emotional and behavioral support >0.67 SD above the sample mean (>5.26; shaded area). This indicates that high levels of emotional and behavioral support were more strongly predictive of differences in children's social integration based on their level of behavioral self-regulation, given that scores lower than 2.44 SD (<3.92) are rare and were not even present in our sample.

Discussion

The aim of the current study was to further investigate possible differential associations between ECE quality and children's social and emotional skills by investigating whether the relation between ECE process quality and children's level of social integration and positive mood depends on children's level of behavioral self-regulation. To capture the most authentic portrayal of children's behaviors (Neisworth & Bagnato, 2004), we observed behavioral self-regulation, social integration, and positive mood within a naturalistic play situation. We hypothesized that children low on behavioral self-regulation would be more strongly influenced by ECE quality than children high on self-regulation, as children low on behavioral self-regulation may rely more heavily on the external regulation of their behaviors (Crockenberg, 2003; Rothbart & Bates, 2006). More specifi-cally, we expected that children low on behavioral self-regulation would be either more *vulnerable* to low-quality ECE (exhibiting the least social integration and positive mood) or in general more *susceptible* to ECE quality (displaying the least social integration and positive mood in the case of low-quality ECE but also showing the most social integration and positive mood when exposed to high-quality ECE).

In terms of child social integration, we indeed found that children low on behavioral self-regulation were more strongly influenced by ECE quality. That is, there was a positive association between classroom emotional and behavioral support and children's social integration for children

low on behavioral self-regulation, whereas there was no such association for children high on behavioral self-regulation. This finding is consistent with studies finding that children low on self-regulation are more strongly influenced by socialization influences in both the home (e.g., Karreman et al., 2009; Rubin et al., 2003) and ECE environment (Broekhuizen et al., 2015; Fabes et al., 1999). However, contrary to our expectations based on this literature, we did not find that children low on behavioral self-regulation were more vulnerable to relatively low-quality ECE or in general more susceptible to both relatively low- and high-quality ECE. Instead, children low on self-regulation only benefitted more from high-quality ECE, displaying more social integration in settings with relatively high levels of emotional and behavioral support compared to their peers who showed high self-regulation.

There are two alternative explanations for the finding that children low on self-regulation were not more vulnerable to relatively low-quality ECE but only more sensitive to relatively high-quality ECE for their level of social integration. The first is that we did not capture negative socialization influences sufficiently to indicate risk. That is, the lowest scores on emotional and behavioral support were in the mid-range (around 4 on a scale of 1 to 7) and can still be considered adequate. These quality levels are consistent with results from the larger cohort study that Dutch teachers tend to provide children with medium to high levels of emotional and behavioral support (Slot, Leseman, Mulder, & Verhagen, 2015). The second reason is that the outcome measure of social integration, ranging from lacking integration to being fully integrated, might not have captured social functioning that is most affected by poor socialization processes. Children low on behavioral self-regulation would perhaps be more vulnerable to relatively low-quality ECE on more extreme negative social behaviors, such as peer conflict and aggression. These negative social behaviors are not the focus of the social integration scale. Thus, additional research using a more diverse sample of classrooms and simultaneous assessments of children's social integration and negative social behaviors, such as peer conflict and aggression, is needed to further elucidate the moderating role of child self-regulation in the relation between ECE process quality and children's early social skills. Nevertheless, our study shows that lower self-regulation abilities do not necessarily have to be a risk factor but can also function as a favorable individual characteristic for children's positive social integration when they are accompanied by supporting environmental influences.

Another finding of the current study is a positive association between classroom emotional and behavioral support and children's positive mood. This finding is consistent with studies reporting positive associations between ECE quality and children's social and emotional skills (e.g., Burchinal, Kainz, et al., 2014; Mashburn et al., 2008; NICHD ECCRN, 2006; Sylva et al., 2011) and extends these findings to the observation of children's positive mood in a real-life play situation. Only one other observational study of which we are aware investigated a similar association between ECE process quality and children's positive mood or well-being as rated by independent observers. However, this study found only a positive association between caregiver sensitivity and children's well-being for children in home-based child care, not for children in center-based child care (Groeneveld, Vermeer, van Ijzendoorn, & Linting, 2010). These divergent results across settings were explained through the higher teacher instability in center-based child care compared to home-based child care, with more than one teacher per group and often different teachers on different days. Nevertheless, the association with positive mood in the current study seems to indicate that observing the more general level of emotional and behavioral support in an ECE setting, which includes teachers' sensitivity, but also the more general classroom climate and the amount of behavioral guidance, can capture characteristics of teacher–child interactions that enhance children's positive mood. However, future studies are warranted to replicate this finding.

The association between emotional and behavioral support and positive mood was not moderated by children's level of behavioral self-regulation, nor was behavioral self-regulation related to children's positive mood. As this was an exploratory study, additional research with more diverse samples is needed to examine whether the association between ECE quality and children's positive mood is indeed not moderated by children's behavioral self-regulation. In addition, it could be that children low on behavioral

self-regulation are more vulnerable to low-quality ECE and/or sensitive to high-quality ECE for indicators of negative mood and not positive mood. Therefore, future studies should simultaneously include indicators of children's negative mood (e.g., sad, anxious behaviors) in order to fully explore whether child self-regulation and ECE quality combine to predict children's emotional well-being.

The results of this study need to be interpreted in light of four limitations. First, the study was cross-sectional, which makes it difficult to draw conclusions about the directions of the identified associations. However, because emotional and behavioral support was averaged over four situations, and not all children present during the recorded situations were observed, it is less likely that children's individual level of positive mood or social integration during one play situation influenced the average level of emotional and behavioral support. Nevertheless, cross-sectional data do not allow us to infer any conclusions about the longer term. To draw stronger conclusions about both the direction of the relation and whether the positive associations between ECE quality and children's social and emotional skills hold over time, future studies should use a longitudinal design to investigate longer term effects on children's social and emotional skills.

Second, within the current cross-sectional design we cannot rule out the possibility that the identified associations with ECE quality were not related to a third factor. However, we reduced this possibility by controlling for several classroom-level characteristics that are potentially related to either selective placement or ECE quality. Moreover, the fact that the association between emotional and behavioral support and children's social integration depended on the level of behavioral self-regulation makes it less likely that our results are solely due to selection bias. That is, children high on social integration do not simply attend high-quality ECE; whether children show more social integration depends on ECE quality *in combination* with children's behavioral self-regulation.

Third, the reliability of our behavioral self-regulation measure was relatively low. However, the identified association with delay-of-gratification tasks assessed half a year earlier strengthens our confidence in the measure. Fourth, this study had a relatively small sample size, especially for investigating interaction effects (i.e., different effects for subgroups of children), which limits the power of our analysis (McClelland & Judd, 1993; Whisman & McClelland, 2005). This issue is amplified by the aforementioned limited variability in emotional and behavioral support, with no classrooms in the low-quality range. This restricted variance makes it more difficult to find (strong) main and interaction effects for emotional and behavioral support. However, the fact that we still found associations between ECE quality and children's positive mood and social integration stresses the significance of high-quality ECE. That is, it makes a difference for children's social and emotional skills whether a child experiences a medium- compared to a high-quality ECE environment, particularly for children with poor self-regulation skills. This conclusion is consistent with studies from the United States showing that scores at the high end of the emotional support scale of the follow-up CLASS Pre-K were more strongly predictive of children's social and emotional outcomes than scores at the middle and low end of the scale (Burchinal et al., 2010; Burchinal, Vernon-Feagans, Vitiello, & Greenberg, 2014). Nevertheless, future studies with larger sample sizes and preferably a wider range of classroom emotional and behavioral support are warranted to replicate and possibly extend our findings.

Despite these limitations, this study has several noteworthy strengths. Although child self-regulation has been acknowledged as an important individual characteristic according to which socialization effects may vary (e.g., Rothbart & Bates, 2006), with some emerging supporting empirical evidence (Broekhuizen et al., 2015; Fabes et al., 1999; Karreman et al., 2009), this is to our knowledge the first study investigating interactions between ECE quality and children's observed behavioral self-regulation in a naturalistic play situation. In this way, we captured not only children's level of behavioral self-regulation but also their ability to implement these skills in a real-life situation with known adults and peers. A similar observation procedure was used for children's level of social integration and positive mood to capture the most authentic portrayal of children's social and emotional skills (Neisworth & Bagnato, 2004). Moreover, we want to reiterate that classroom emotional and behavioral support, children's behavioral self-regulation, and

children's social integration and positive mood were scored by independent raters, which reduces the possibility that the identified associations can be explained by shared method variance.

To summarize, the current study emphasizes the importance of emotionally and behaviorally supportive classroom experiences for children's social and emotional skills in ECE. Moreover, the results indicate that lower behavioral self-regulation abilities not only are perhaps a risk factor for children's social and emotional skills but also can function as a favorable individual characteristic for children's positive social integration when they are accompanied by supportive environments. This means that experts should perhaps stop thinking of children low in self-regulation as being at risk and start seeing them as children who can flourish in, for example, social skills when they receive the right type of support. A methodological implication of this study is that it appears to be useful to investigate children's behavioral self-regulation in context. Although replication of the results is warranted, it seems that intervention strategies and policies that focus on supporting and stimulating emotionally and behaviorally supportive ECE experiences can promote children's social and emotional skills. It seems that when teachers in ECE fail to provide high levels of emotional and behavioral support, an important chance for stimulating children's social and emotional skills is missed.

Funding

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